UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/395,993	09/15/1999	ALISON JOAN LENNON	169.1451	6766

5514 7590 01/29/2004

FITZPATRICK CELLA HARPER & SCINTO
30 ROCKEFELLER PLAZA
NEW YORK, NY 10112

EXAMINER	
DASTOURI, MEHRDAD	
ART UNIT	**PAPER NUMBER**
2623	17

DATE MAILED: 01/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/395,993	LENNON, ALISON JOAN	
	Examiner	Art Unit	
	Mehrdad Dastouri	2623	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *31 October 2003*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-18,20-35,37-52,54-66,68-80 and 82-94* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1, 3-18, 20-35, 37-52, 54-66, 68-80 and 82-94* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Response to Amendment

1. Applicant's amendment filed on October 31, 2003, has been entered and made of record.

2. Applicant's arguments regarding Claims 1, 18, 35, 52, 66 and 80 have been fully considered but they are not persuasive.

Applicant argues that prior art of record (Modestino et al) do not disclose, "analyzing a region adjacency graph to identify predetermined patterns of the semantic labels"

The Examiner disagrees and indicates that Modestino et al clearly disclose this limitation (Abstract; Figure 1; Pages 608-609, Section III-B. The image in Figure 1a is segmented into homogeneous nodes or regions, $\boldsymbol{R} = \{R_1, R_2, \ldots, R_n)$ as depicted in Figure 1(c). Section IIIB describes predetermined patterns of the semantic labels; e.g., the second type of clique basis functions for spatial constraints, "a car should be on the road" or "a car should never be in the sky.).

Applicant further argues that Modestino do not teach or suggest assigning a predetermined stereotype to digital image according to each with a plurality of semantic labels in the labeled region adjacency graph.

The Examiner disagrees and indicates as discussed above, Modestino et al analyzes predetermined patterns of the semantic labels in the labeled region adjacency graph. In Page 606, Introduction, Modestino et al clearly indicates "In high-level processing, image domain knowledge is used to assign object label to the primitives,

thereby providing a semantic description of the image. **The joint assignment of object labels for all the image primitives provides a stereotype interpretation of the image.**

This means a stereotype (high-level interpretation) is associated with the image semantic label. Modestino et al teachings clearly disclose this concept (Figures 1(a)-1(c), 5(a)-5(d) and 6(a)-6(d); Tables I-IV; Page 606, Section I, Introduction, Paragraphs 1-3; Pages 610-613, Sections V-VII. Modestino et al disclose a Markov Random Field (MRF) model-based approach image interpretation and classification by performing knowledge-based high-level processing via assigning higher-level expressions (Stereotypes) to the classified objects. The region adjacency graph is classified based on higher-level expression or stereotypes (e.g., rural road scenes comprising road, field, car and sky). "Two regions" and "three regions" categories depicted in Table I in association of Figures 1(a)-1(c) are stereotype or higher-level expressions.).

Furthermore, the teachings of secondary prior art of record, Jain et al (US 6,360,234), relied upon for the rejection of Claims 13-16, 47-51 and 30-33 in previous Office Action, also disclose assigning stereotypes to digital images based on the features and characteristics of the labeled segments of the digital image. The Examiner, for further emphasis, includes the same basis for rejection of Claims 13-16, 47-51 and 30-33, in the rejection of amended Claim 1 and analogous Claims.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1, 3-10, 13-16, 18, 20-27, 30-33, 35, 37-44, 47-50, 52, 54-61, 66, 68-75, 80, 82-89 and 94 are rejected under 35 U.S.C. 103(a) as being unpatentable over Modestino et al (IEEE Paper ISBN: 0162-8828; A Markov random Field Model-Based Approach to Image Interpretation) in view of Jain et al (US 6,360,234).

Regarding Claim 1, Modestino et al disclose a method of classifying a digital image, said method comprising the steps of:

segmenting the digital image into substantially homogeneous regions (Figure 1; Pages 607-608, Section II-B. The image in Figure 1a is segmented into homogeneous nodes or regions, $\boldsymbol{R} = \{R_1, R_2, \ldots, R_n\}$ as depicted in Figure 1(c).);

processing the regions to provide a labeled region adjacency graph (Figure 1; Section II) for the digital image, the region adjacency graph representing adjacencies between the regions of the digital image, at least one of the regions of the labeled region adjacency graph being associated with one of a plurality of predetermined semantic labels (Figure 1; Page 607, Column 2, Section IIB, first Paragraph. $\boldsymbol{G} = \{\boldsymbol{R}, \boldsymbol{E}\}$ is the region adjacency graph comprising of the set of nodes $\boldsymbol{R} = \{R_1, R_2, \ldots, R_N\}$ and the set of edges $\boldsymbol{E}$ connecting the regions. The labels assigned to the segmented regions. $\boldsymbol{L} = \{L_1, L_2, \ldots, L_M\}$ is the set of all predetermined semantic labels.);

analyzing the labeled region adjacency graph to identify one or more predetermined patterns of the semantic labels in the labeled region adjacency graph (Abstract; Figure 1; Pages 608-609, Section III-B. The image in Figure 1a is segmented

into homogeneous nodes or regions, $\boldsymbol{R} = \{R_1, R_2, \ldots, R_n)$ as depicted in Figure 1(c). Section IIIB describes predetermined patterns of the semantic labels; e.g., the second type of clique basis functions for spatial constraints, "a car should be on the road" or "a car should never be in the sky. Predetermined patterns of the semantic labels are identified as shown in Tables I-IV, i.e., possible combinations and impossible combinations.); and

assigning one or more of a plurality of predetermined stereotypes (based on reasonable broad interpretation of stereotype) to the digital image according to each identified predetermined pattern of the semantic labels in the labeled region adjacency graph, wherein each of the predetermined stereotypes corresponds to at least one of the predetermined patterns such that the assigned stereotype represents a classification of the digital image based on each predetermined pattern identified in the labeled region adjacency graph (Figures 1, 5(a)-5(d), 6(a)-6(c); Page 606, Introduction; Pages 608-609, Section III-B; Tables I-IV. The region adjacency graph is classified based on higher-level expression or stereotypes (e.g., rural road scenes comprising road, field, car and sky. "Two regions" and "three regions" categories depicted in Table I in association of Figures 1(a)-1(c) are components of stereotypes or higher-level expressions. The joint assignment of object labels for all the image primitives provides a stereotype for interpretation of the image. The digital image is classified based on the identified patterns (features) of the regions as depicted in Figures 1, 5(a)-5(d), 6(a)-6(c) and Tables I-IV.).

Furthermore, Jain et al also disclose providing metadata associated with the digital image, wherein the metadata includes the stereotypes of the digital image (Narrower interpretation of stereotype; Figures 16 and 17; Column 13, Lines 52-67, Column 14, Lines 1-31).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Modestino et al invention according to the teachings of Jain et al assigning one or more of a plurality of predetermined stereotypes to the digital image according to each identified predetermined pattern of the semantic labels in the labeled region adjacency graph, wherein each of the predetermined stereotypes corresponds to at least one of the predetermined patterns such that the assigned stereotype represents a classification of the digital image based on each predetermined pattern identified in the labeled region adjacency graph because it will increase the accuracy and reliability of the classification system. It will intelligently interpret digital images based on the high and low-level characteristics, features and contents of the images.

Regarding Claim 3, Modestino et al further disclose the method according to Claim 1, wherein identification of the predetermined pattern is based on a size of one or more regions of the digital image (Section III, first paragraph; Section IIIB; Tables I-IV. Classification is based on the areas and the boundary lengths of the regions identified by the RAG nodes.).

Regarding Claim 4, Modestino et al further disclose the method according to Claim 1, wherein identification of the predetermined pattern is based on an adjacency of

the regions (Figure 1; Pages 608-609, Section III-B; Figures 1 and 6(b). Region adjacency graphs are inherently generated based on the spatial dependence of objects in the relative proximity of each other as depicted in Figure 1(c).).

Regarding Claim 5, Modestino et al further disclose the method according to Claim 1, wherein identification of the predetermined pattern is based on semantic label content of the region adjacency graph (Figure 1; Pages 608-609, Section III).

Regarding Claim 6, Modestino et al further disclose the method according to Claim 1, wherein identification of the predetermined pattern is based on a mean color of one or more regions of the digital image (Figure 1; Pages 608-609, Section III; Page 613, Table III(a), Average Gray Level of the regions).

Regarding Claim 7, Jain et al further disclose the method according to Claim 1, wherein the plurality of stereotypes are stored in an association lookup table (Figures 6, 9, 16 and 17; Column 6, Lines 29-47; Column 13, Lines 52-67, Column 14, Lines 1-31).

Regarding Claim 8, Jain et al further disclose the method according to Claim 1, wherein the stereotypes are represented in a hierarchal arrangement (Figures 7, 9 and 17; Column 6, Lines 29-47; Column 13, Lines 52-67, Column 14, Lines 1-31).

Regarding Claim 9, Jain et al further disclose the method according to Claim 7, wherein each of the stereotypes has a hierarchical path arrangement (Figures 6, 7, 9 and 17; Column 6, Lines 29-47; Column 13, Lines 52-67, Column 14, Lines 1-31).

Regarding Claim 10, Modestino et al disclose the method according to Claim 1, wherein the region adjacency graph is provided by analyzing contextual data associated

with one or more regions of the digital image (Abstract; Page 606, Introduction; Figure 1, Page 607-609, Sections IIB and 3, first Paragraph).

Regarding Claim 13, Modestino et al do not disclose the method according to Claim 1, further comprising the step of providing metadata associated with the digital image, wherein the metadata includes the stereotypes of the digital image.

Jain et al disclose a method for video cataloging by providing metadata associated with the image comprising the step of providing metadata associated with the digital image, wherein the metadata includes the stereotypes of the digital image (Figures 16 and 17; Column 13, Lines 52-67, Column 14, Lines 1-31).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Modestino et al invention according to the teachings of Jain et al to provide metadata associated with the digital image, wherein the metadata includes the stereotypes of the digital image because it will improve image appearance and enhance image classification. It will accurately classify and intelligently extract information, termed metadata, about the contents of video stream in real time (Jain et al, Column 1, Lines 46-49)

Regarding Claim 14, Jain et al further disclose the method according to Claim 13, wherein the metadata includes a hierarchical path associated with the respective stereotype of each digital image (Figures 9, 15-17; Table 1; Column 8, Lines 22-61).

Regarding Claim 15, Jain et al further disclose the method according to Claim 14, wherein the hierarchical path is stored with a respective stereotype as a metadata

object which is associated with a respective image object (Figure 6; Column 6, Lines 29-38).

Regarding Claim 16, Jain et al further disclose the method according to Claim 14, wherein the hierarchical path is stored as a referenced lookup table (Figure 7).

With regards to Claims 18, 35, 52, 66, 80 and 94, arguments analogous to those presented for Claim 1 are applicable to Claims 18, 35, 52, 66, 80 and 94. Concerning Claims 52, 66 and 80, Modestino et al further disclose providing a set of labeled regions (Abstract Lines 5-10; Page 607, Column 2, Section IIB, second paragraph, set of labels $L = \{L_1, L_2, \ldots, L_M\}$). Markov Random Field (MRF) model-based approach segments the image into a collection of disjoint regions that form the nodes of an adjacency graph. Once the adjacency graph has been determined, image classification will be achieved through assigning object labels to the segmented regions using domain knowledge, extracted feature measurements, and spatial relationship between the various regions (Abstract, Lines 5-10).

With regards to Claims 20, 37, 56, 70 and 84, arguments analogous to those presented for Claim 3 are applicable to Claims 20, 37, 56, 70 and 84.

With regards to Claims 21, 38, 55, 69 and 83, arguments analogous to those presented for Claim 4 are applicable to Claims 21, 38, 55, 69 and 83.

With regards to Claims 22, 39, 54, 68 and 82, arguments analogous to those presented for Claim 5 are applicable to Claims 22, 39, 54, 68 and 82.

With regards to Claims 23, 40, 57, 58, 71, 72, 85 and 86, arguments analogous to those presented for Claim 6 are applicable to Claims 23, 40, 57, 58, 71, 72, 85 and 86.

With regards to Claims 24, 41, 59, 73 and 87, arguments analogous to those presented for Claim 7 are applicable to Claims 24, 41, 59, 73 and 87.

With regards to Claims 25, 42, 60, 74 and 88, arguments analogous to those presented for Claim 8 are applicable to Claims 25, 42, 60, 74 and 88.

With regards to Claims 26, 43, 61, 75 and 89, arguments analogous to those presented for Claim 9 are applicable to Claims 26, 43, 61, 75 and 89.

With regards to Claims 27 and 44, arguments analogous to those presented for Claim 10 are applicable to Claims 27 and 44.

Regarding Claim 30, Modestino et al do not disclose the method according to Claim 18 further comprising the step of providing metadata associated with the digital image, wherein the metadata includes the stereotypes of the digital image.

Jain et al disclose a method for video cataloging by providing metadata associated with the digital image, wherein the metadata includes stereotypes of the digital image (Figures 16 and 17; Column 13, Lines 52-67, Column 14, Lines 1-31).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Modestino et al invention according to the teachings of Jain et al to provide metadata associated with the digital image, wherein the metadata includes stereotypes of the digital image because it will accurately classify and

intelligently extract information, termed metadata, about the contents of video stream in real time (Jain et al, Column 1, Lines 46-49).

With regards to Claim 31, arguments analogous to those presented for Claim 14 are applicable to Claim 31.

With regards to Claim 32, arguments analogous to those presented for Claim 15 are applicable to Claim 32.

With regards to Claim 33, arguments analogous to those presented for Claim 16 are applicable to Claim 33.

With regards to Claim 47, arguments analogous to those presented for Claim 13 are applicable to Claim 47.

With regards to Claim 48, arguments analogous to those presented for Claim 14 are applicable to Claim 48.

With regards to Claim 49, arguments analogous to those presented for Claim 15 are applicable to Claim 49.

With regards to Claim 50, arguments analogous to those presented for Claim 16 are applicable to Claim 50.

5. Claims 11, 17, 28, 34, 51, 45, 62-65, 76-79 and 90-93 are rejected under 35 U.S.C. 103(a) as being unpatentable over Modestino et al further in view of Jain et al (US 6,360,234) and Li et al (U.S. 5,930,783).

Regarding Claim 11, Modestino et al and Jain et al do not explicitly disclose the method according to Claim 10, wherein the contextual data comprises information generated by one or more separate sources of the information.

Li et al disclose a semantic and cognition based image retrieval methodology comprising analyzing contextual data generated by one or more separate sources of information (Figure 1B, Semantic-based Query, Cognition-based Query; Column 12, Lines 30-40).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Modestino et al and Jain et al combination according to the teachings of Li et al to analyze contextual data generated by one or more separate sources of information because it will expand versatility of the image segmentation and classification. It will utilize the advantages of image retrieval based on both image semantics and visual examples of the image (Li et al, Column 3, Lines 27-35).

Regarding Claim 17, Modestino et al and Jain et al do not explicitly disclose the method according to Claim 1, wherein said digital image is stored in a database of digital images and wherein said classification can be used to retrieve said digital image from said database.

Li et al disclose a semantic and cognition based image retrieval methodology wherein the digital image is stored in a database of digital images and wherein the classification can be used to retrieve said digital image from the database (Column 4, Lines 32-50).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Modestino et al and Jain et al combination according to the teachings of Li et al to use classification to retrieve the digital images stored in a database because it will utilize a plurality of information sources for image retrieval

including semantic-based, cognition-based and scene-based queries thereby eliminating weakness of the individual approaches (Li et al; Column 3, Lines 27-35).

With regards to Claims 28 and 45, arguments analogous to those presented for Claim 11 are applicable to Claims 28 and 45.

With regards to Claim 34, arguments analogous to those presented for Claim 17 are applicable to Claim 34.

With regards to Claim 51, arguments analogous to those presented for Claim 17 are applicable to Claim 51.

With regards to Claims 63, 77 and 91, arguments analogous to those presented for Claim 17 are applicable to Claims 63, 77 and 91. Li et al retrieve the digital image by using a keyword representing a stereotype (Column 12, Lines 30-50).

With regards to Claims 64, 78 and 92, arguments analogous to those presented for Claim 17 are applicable to Claims 64, 78 and 92. Modestino et al, Jain et al and Li et al do not explicitly retrieve the digital image by using an icon to represent a stereotype. Utilizing an icon to represent a keyword is extremely well known in the art (Official Notice).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Modestino et al, Jain et al and Li et al combination to Utilize an icon for representing a keyword because icons are a significant factor in the user- friendliness of graphical user interface that serve as visual mnemonics to allow the user to control certain computer actions without having to remember commands or type them at the keyboard.

With regards to Claims 62, 76 and 90, arguments analogous to those represented for Claim 64 concerning utilizing an icon is applicable to claims 62, 76 and 90.

With regards to Claims 65, 79 and 93, arguments analogous to those presented for Claim 17 are applicable to Claims 65, 79 and 93. Li et al retrieve the digital image by using a keyword representing a generalization of a stereotype (Column 12, Lines 30-50).

Regarding Claim 12, neither Modestino et al nor Li et al disclose the method according to Claim 11, wherein a corresponding portion of said contextual data is obtained from a temporal region of interest for each source of said information.

Jain et al disclose a method for video cataloging by providing metadata associated with the image wherein a corresponding portion of contextual data is obtained from a temporal region of interest for each source of information (Figures 6-9; Column 6, Lines 30-67).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Modestino et al and Li et al combination according to the teachings of Jain et al to obtain a corresponding portion of the contextual data from a temporal region of interest for each source of information because it will accurately classify and intelligently extract information, termed metadata, about the contents of video stream in real time (Jain et al, Column 1, Lines 46-49).

With regards to Claims 29 and 46, arguments analogous to those presented for Claim 12 are applicable to Claims 29 and 46.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Contact Information

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mehrdad Dastouri whose telephone number is (703) 305-2438. The examiner can normally be reached on Monday to Friday from 8:00 a.m. to 4:30 p.m. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on (703) 308-6604.

The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306 for regular and for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center Customer Service Office whose telephone number is (703) 306-0377.

MEHRDAD DASTOURI
PRIMARY EXAMINER

Mehrdad Dastouri

Mehrdad Dastouri
Primary Examiner
Group Art Unit 2623
January 25, 2004